

LAB #4: Processing of Multi Beam Echo-Sounding Data

Part A: Data import and Project creation

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Course Code: ESSE 4650

Introduction

This lab is part of a 3-part lab based on the processing of multibeam data. This lab covers data import and project creation.

Methodology and Discussion

Deliverable 1

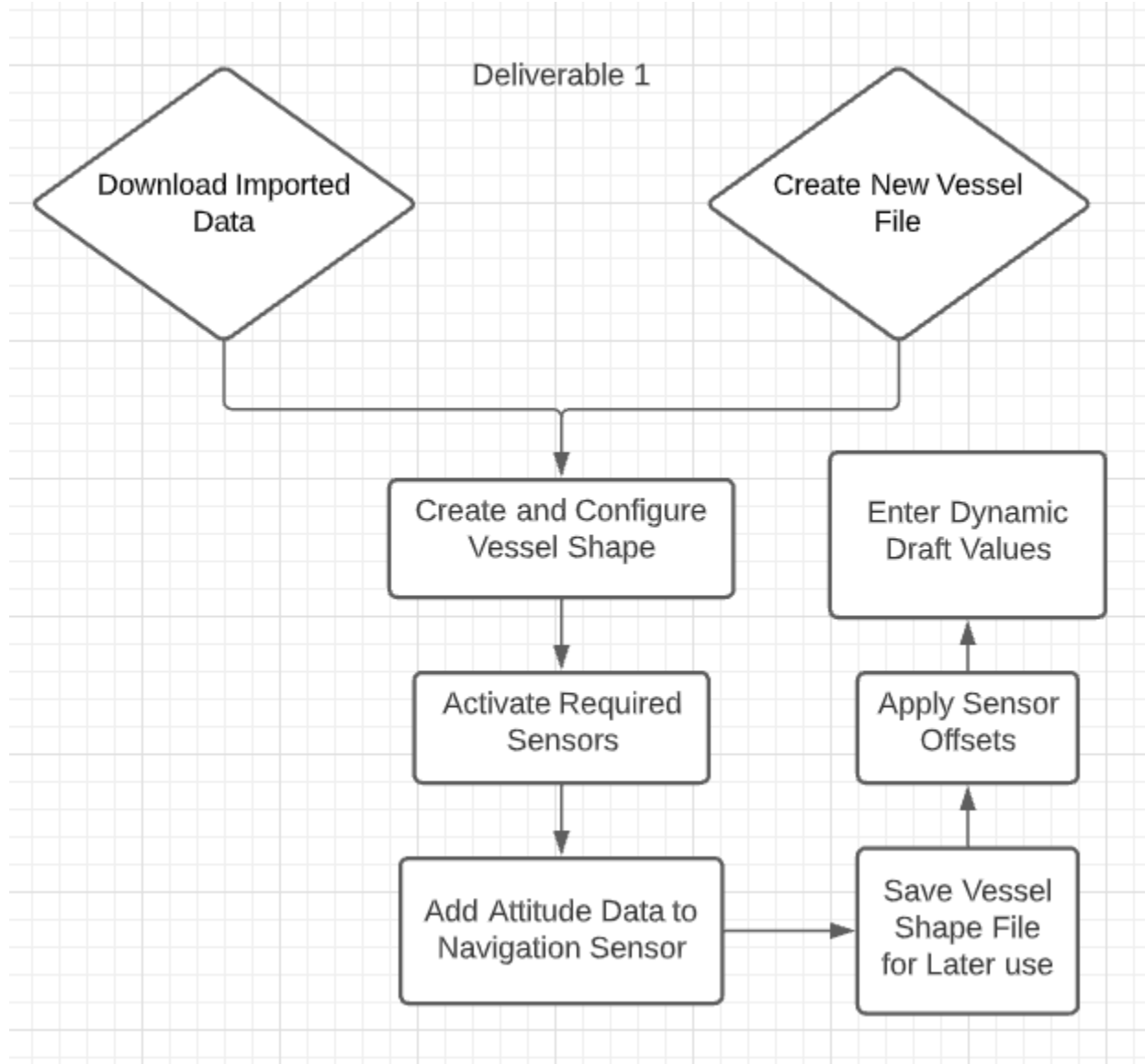


Figure 1: Deliverable 1 Workflow

I created vessel file and stored on March 4, 2022 at 11:30 AM

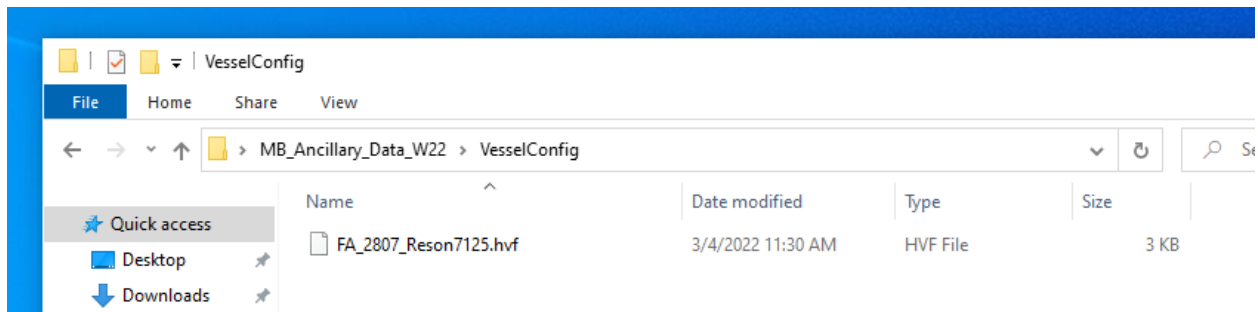


Figure 2: Vessel File Created and Stored

This view is from the X axis perspective. We can see the water level (gray level) is adjusted to sink the vessel into the water 0.9 meters. The Transducer 1 sensor (blue point) offsets are inputted w.r.t to the RP (yellow point).

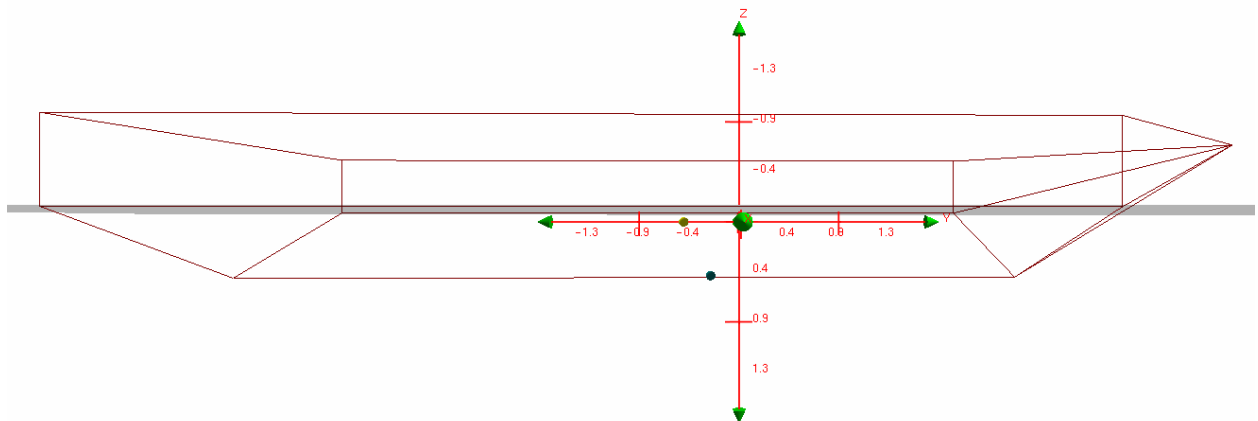


Figure 3: Vessel Shape Including Sensors with Applied Parameters

Deliverable 2

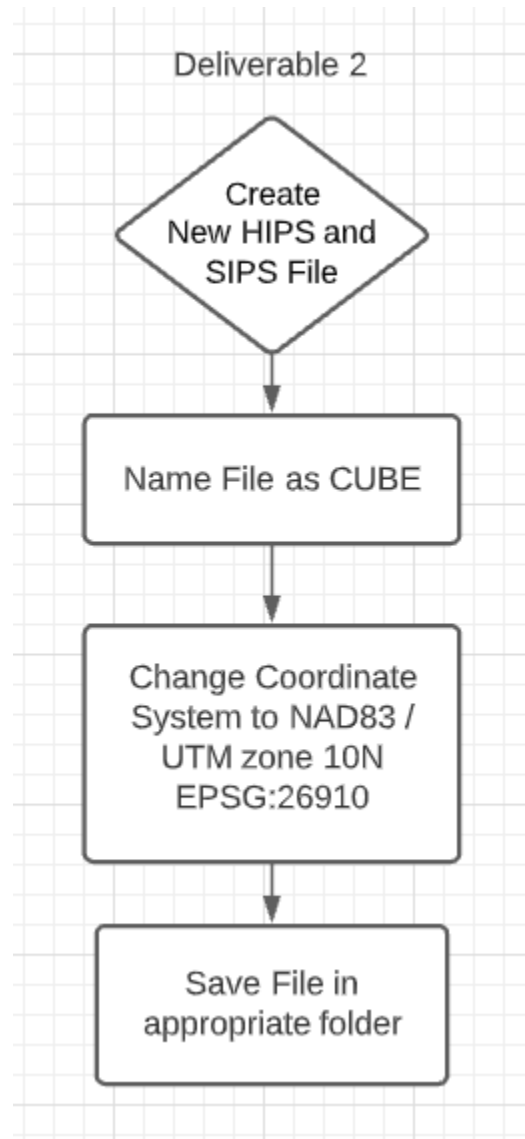


Figure 4: Deliverable 2 Workflow

We can see the time of where the file was created which can be matched to the file saved in the folder.

```
Output
===== Create HIPS File start: Mar 4, 2022 12:03:47 PM =====
===== Create HIPS File end: Mar 4, 2022 12:03:47 PM (Elapsed Time: 00:00:00) =====
```

Figure 5: Output Window in CARIS HIPS and SIPS Program

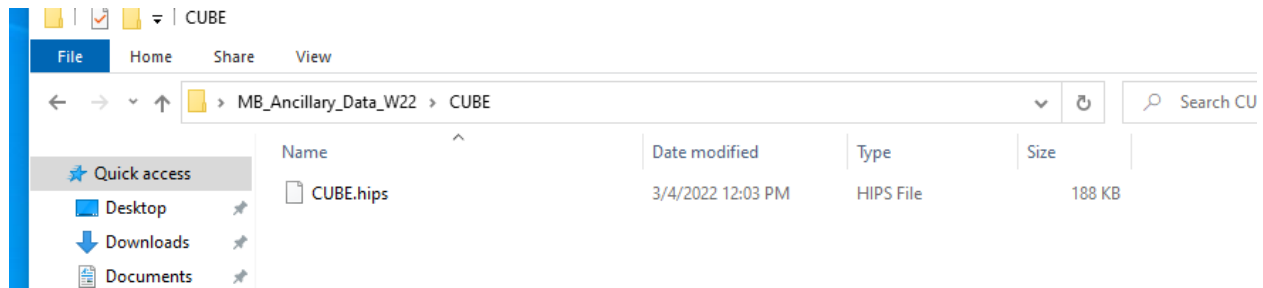


Figure 6: Location of the File Stored

Deliverable 3, 4, 5, and 6

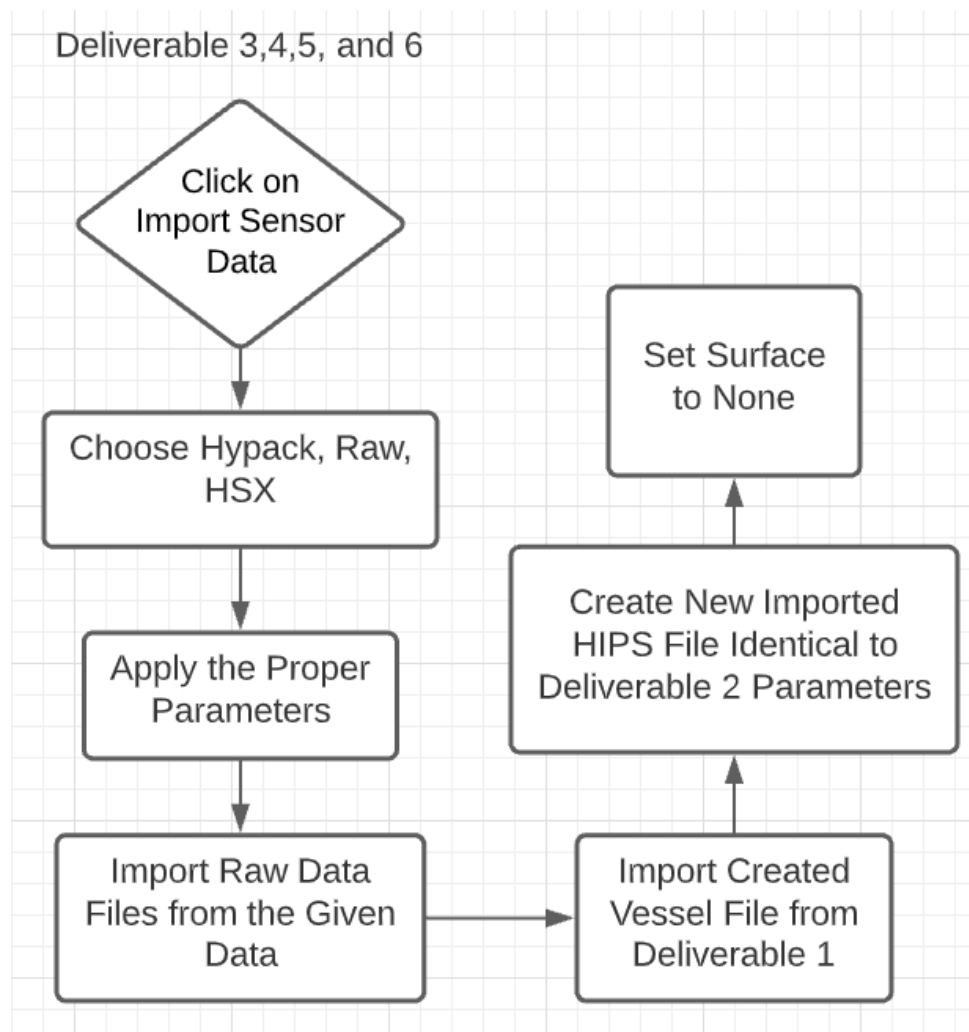


Figure 7: Deliverable 3,4,5, and 6 Workflow

We can see 14 survey lines have been read in from the two Julian Dates.

```
Rejected by Disabled Beam: 1461

14 lines added to C:\Users\longryan\Desktop\MB_Ancillary_Data_W22\CUBE\CUBE\CUBE.hips
14 of 14 lines successfully converted.
===== Hypack RAW, HSX end: Mar 4, 2022 12:24:55 PM (Elapsed Time: 00:00:11) =====
```

Figure 8: Output Window of Survey Lines

Here are the survey lines stored in the file. There is a copy of each survey line due to an error with a missing output window.

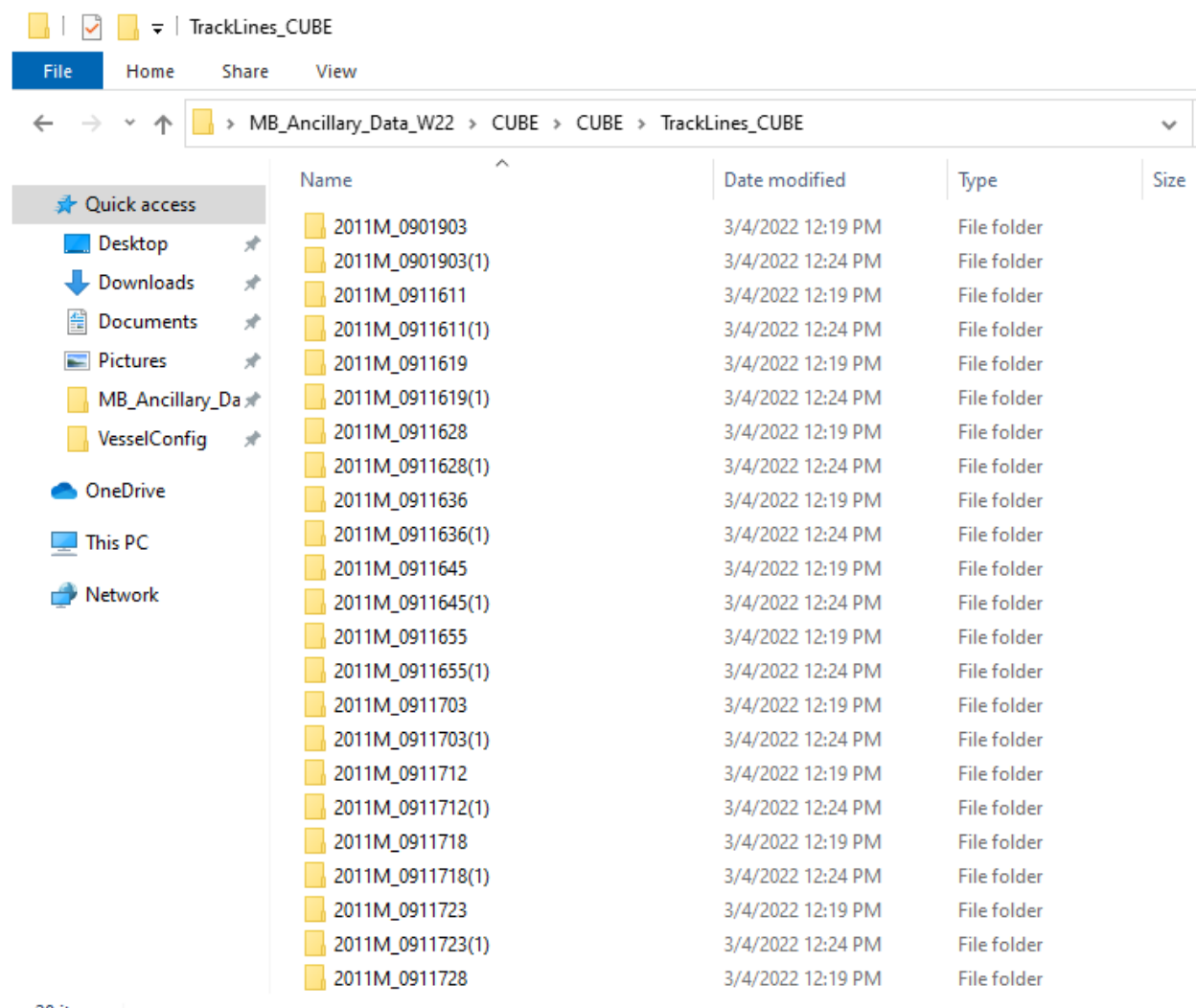


Figure 9: Survey Lines Saved in Track Lines Folder

This is what the survey lines look in the CARIS HIPS and SIPS Program

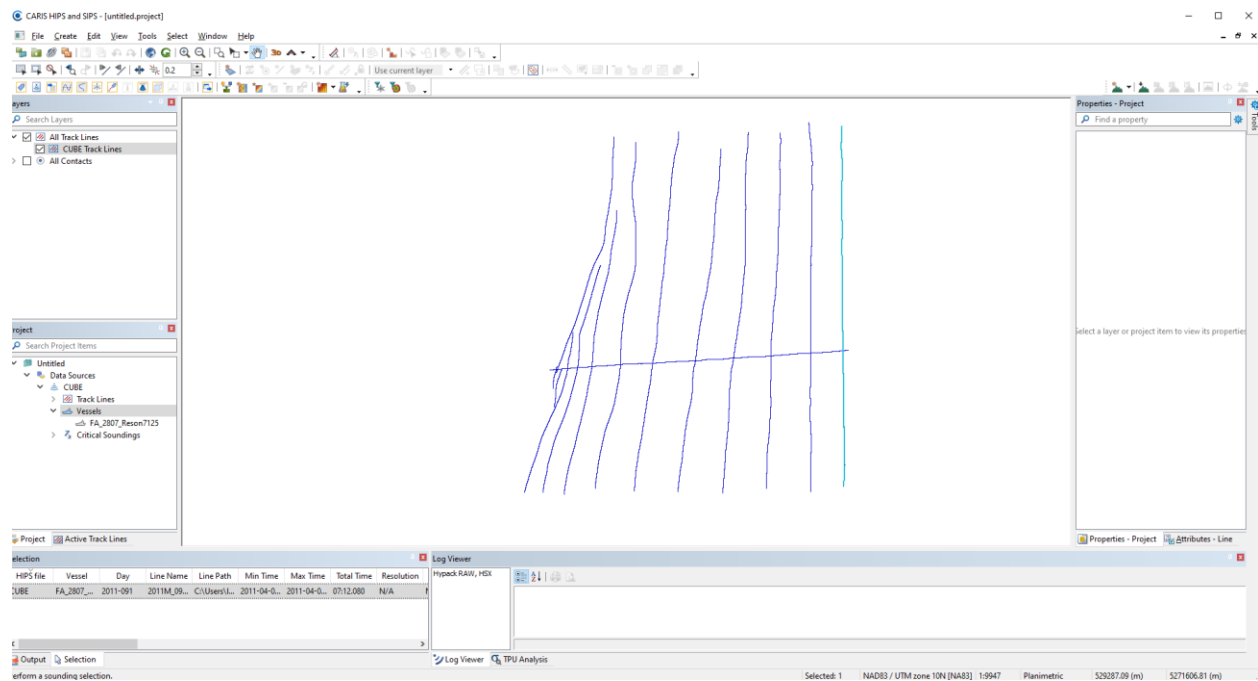


Figure 10: Survey Lines Imported on CARIS HIPS and SIPS Program

This cross line represents a “check” line that is used to check if the depths are similar to the depths going in the other direction to make sure the depths are accurate, that the measurements look reasonable, and follow survey order. This line runs across so that it covers all the track lines.

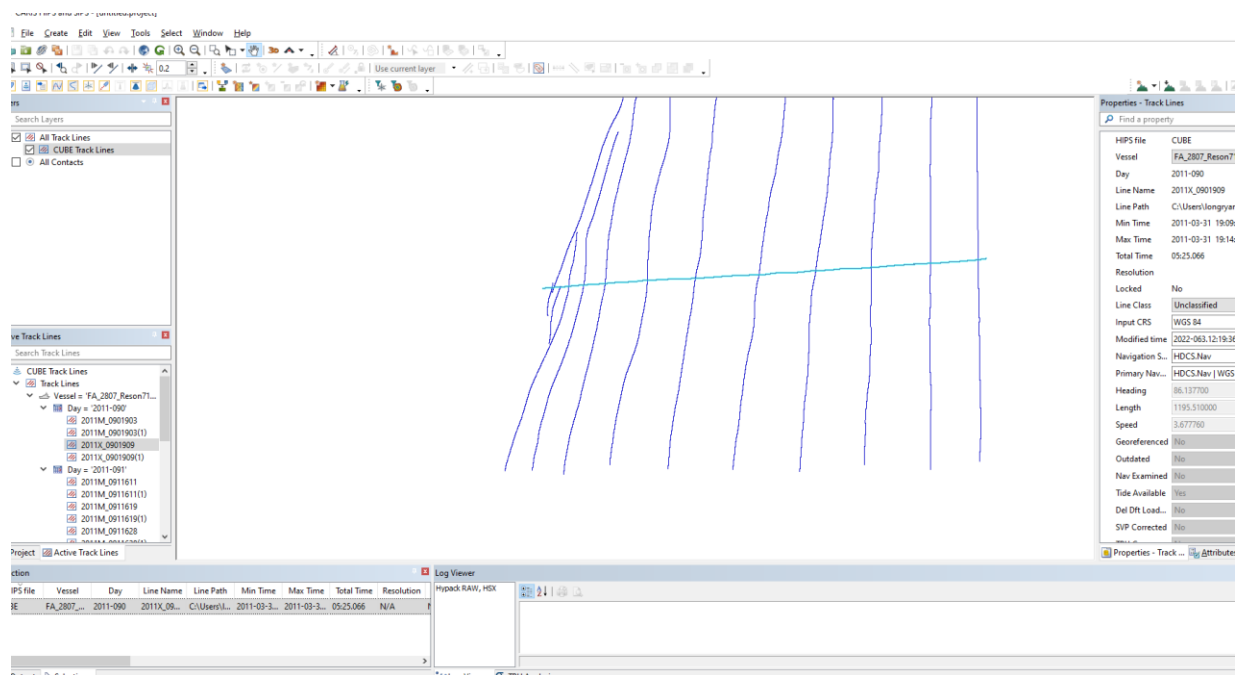
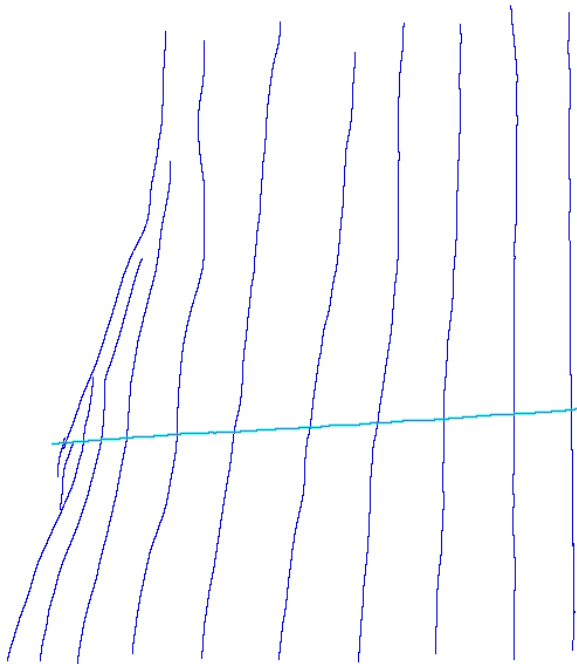


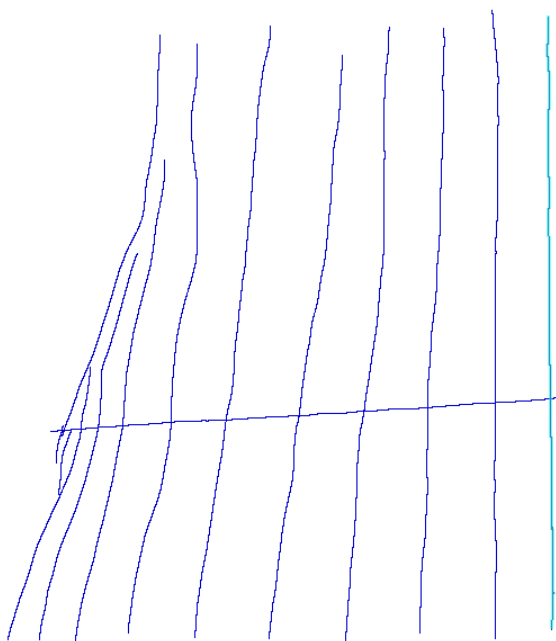
Figure 11: Cross Line Highlighted

Using the lengths of the cross line and one of the survey lines, we can find the geographical coverage or area that the survey encompasses.



Attributes	
HIPS file	CUBE
Vessel	FA_2807_Reson7
Day	2011-090
Line Name	2011X_0901909
Line Path	C:\Users\longrya\...
Min Time	2011-03-31 19:0
Max Time	2011-03-31 19:1
Total Time	05:25.066
Resolution	
Locked	<input type="checkbox"/> No
Line Class	Unclassified
Input CRS	WGS 84
Modified time	2022-063.12:19:3
Navigation Source	HDGS.Nav
Primary Navigatio	HDGS.Nav WGS
Heading	86.14
Length	1195.51
Speed	3.68
Georeferenced	No
Outdated	No
Nav Examined	No
Tide Available	Yes
Del Dft Loaded	No
SVP Corrected	No
TPU Computed	No
GPS Vertical Refer	No
Raw Range	Yes

Figure 12: Length of the Cross Line



Attributes - Line	
HIPS file	CUBE
Vessel	FA_2807_Reson7125
Day	2011-091
Line Name	2011M_0911611
Line Path	C:\Users\longryan\...
Min Time	2011-04-01 16:11:49.
Max Time	2011-04-01 16:19:01.
Total Time	07:12.080
Resolution	
Locked	<input type="checkbox"/> No
Line Class	Unclassified
Input CRS	WGS 84
Modified time	2022-063.12:19:36
Navigation Source	HDGS.Nav
Primary Navigatio	HDGS.Nav WGS 84
Heading	359.67
Length	1434.33
Speed	3.32
Georeferenced	No
Outdated	No
Nav Examined	No
Tide Available	Yes
Del Dft Loaded	No
SVP Corrected	No
TPU Computed	No
GPS Vertical Refer	No
Raw Range	Yes

Figure 13: Length of One of the Survey Lines

Cross Line length: 1195.51 m.

Survey Line length: 1434.33 m.

The area of the survey is $1195.51 \times 1434.33 = 1,714,755.86 \text{ m}^2$

Deliverable 7 and 8

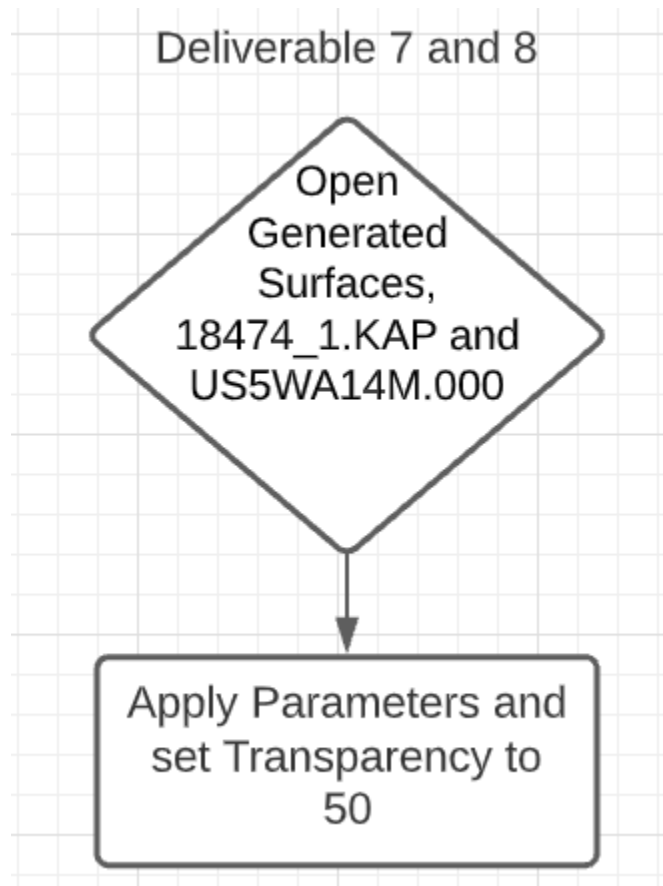


Figure 14: Deliverable 7 and 8 Workflow

We can see 2 new layers were added, US5WA14M and 18474_1 along with the CUBE Track Lines for a total of 3 layers. This is a screenshot of background data layers with the blue box representing the survey lines.

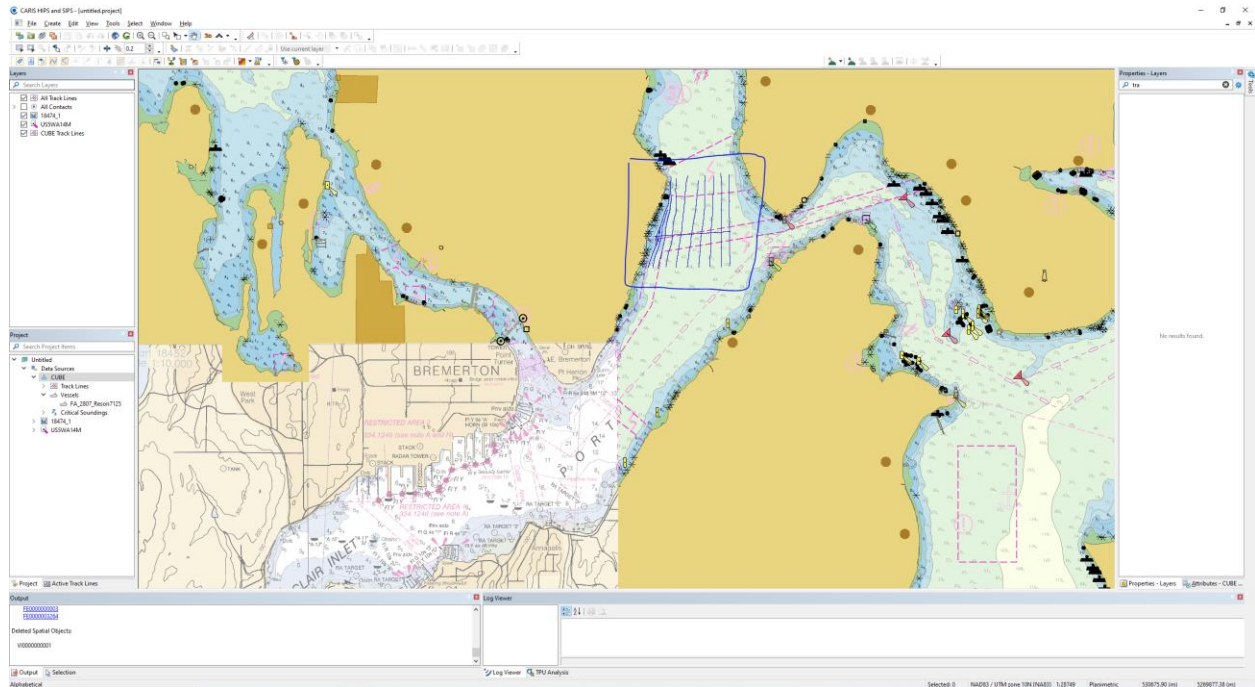


Figure 15: Background Data Layers + Survey Lines

Deliverable 9

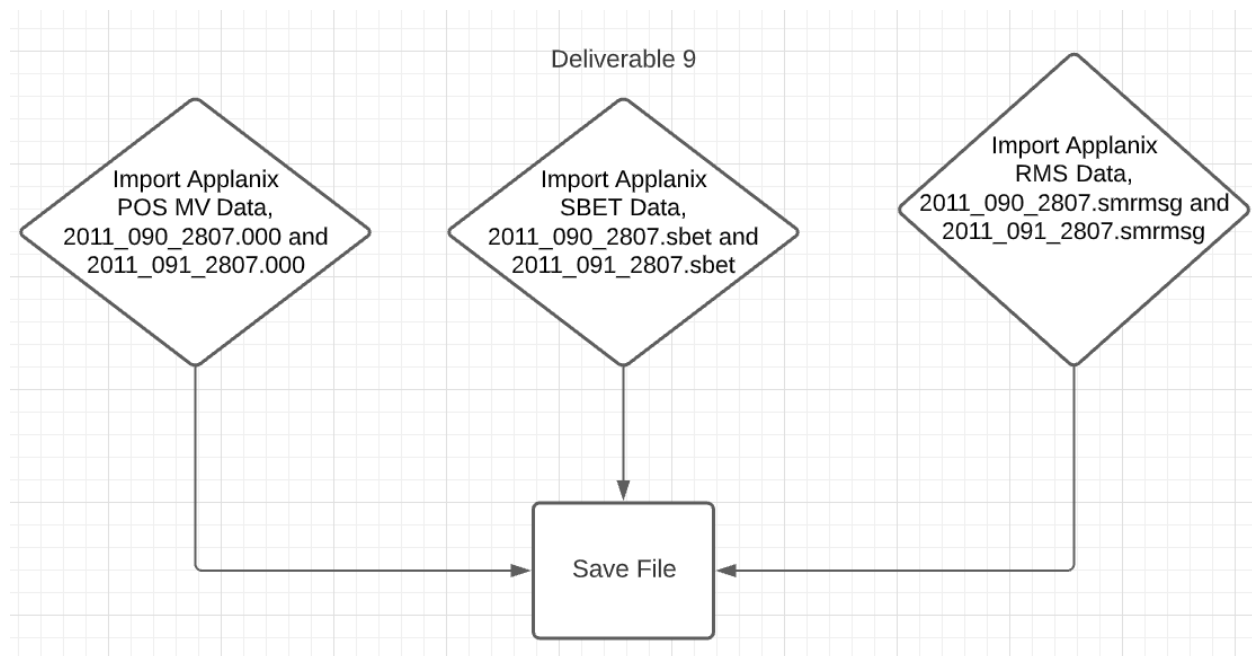


Figure 16: Deliverable 9 Workflow

Here are figures of the data imported. Real time uncertainty data is required because it shows if the navigation of the boat is on the right path to adjust in real time so that the errors aren't increasing. This is so we can fix in real time as soon as possible and to keep the boat on path to record accurate measurements.

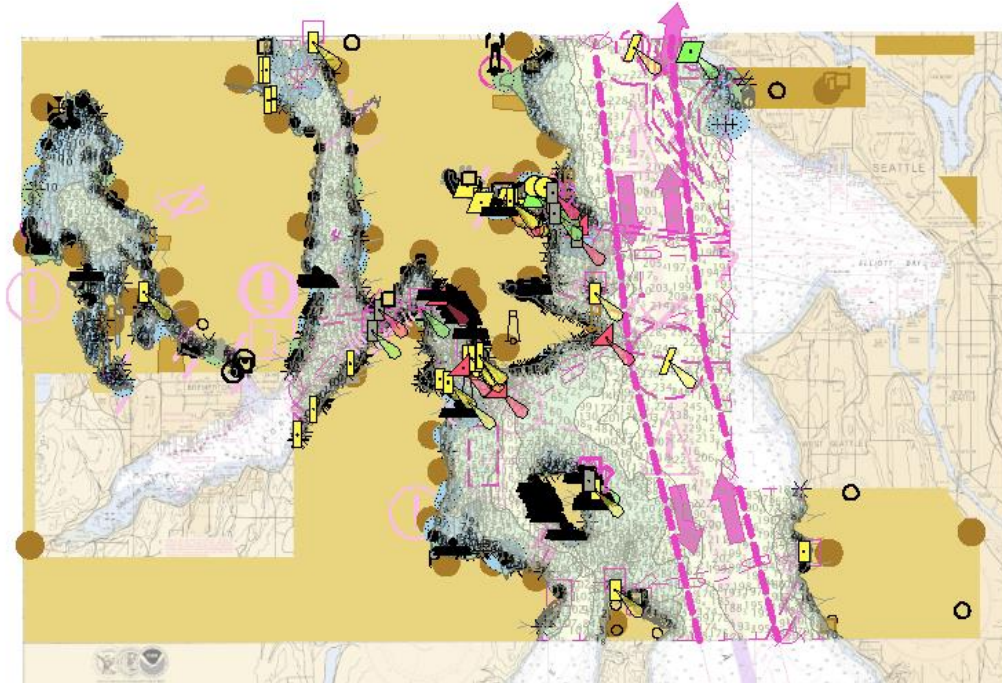


Figure 17: Figure of Map

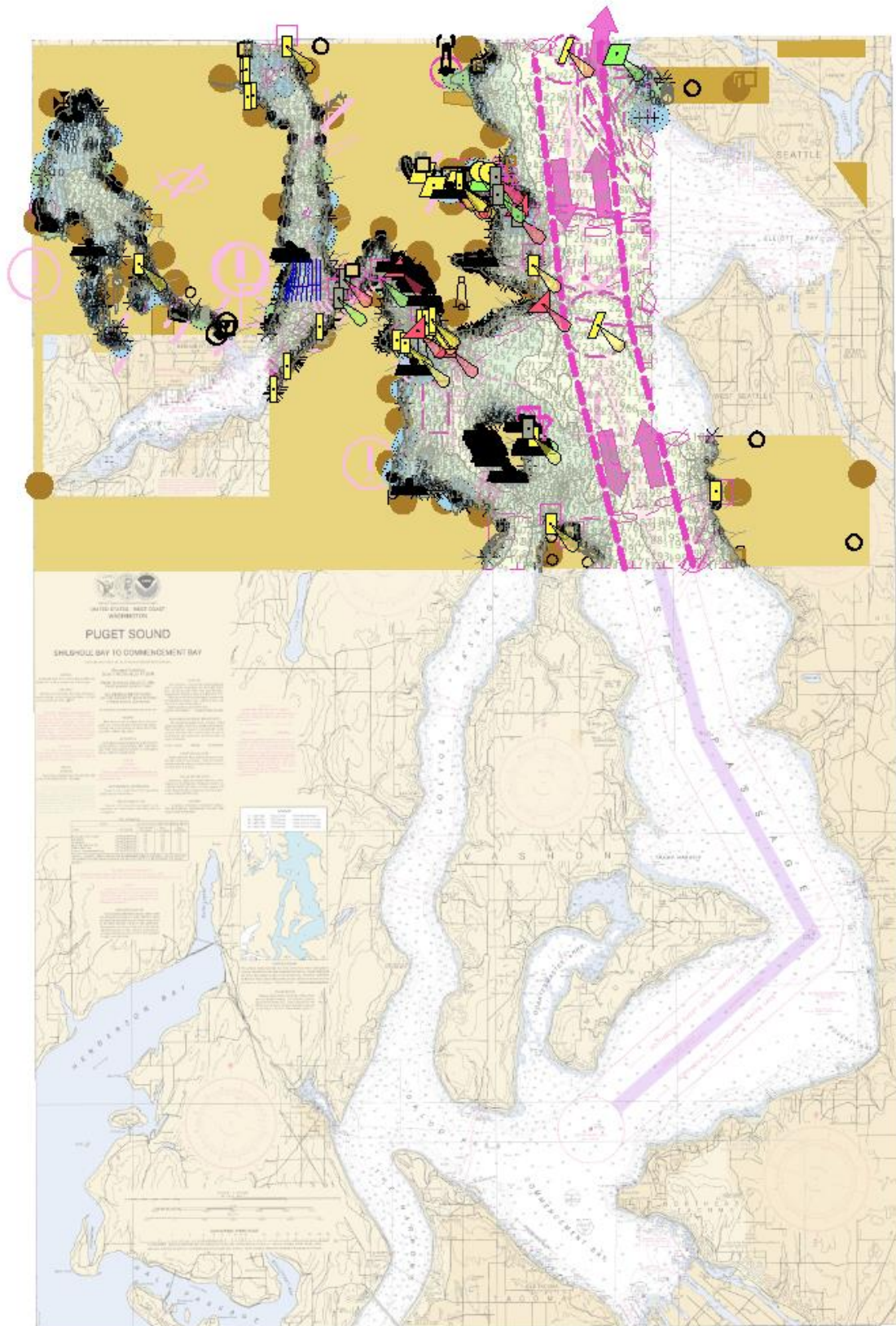


Figure 18: Figure of Entire Data Imported